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ABSTRACT

Education is in transition between the ascendent microelectronic and descendent industrial revolutions, with purposes ambiguously linked to both. These purposes must be clarified before educational leaders can establish priorities for adapting education to the needs of a society transformed by microelectronic technology. Accordingly, the features of the microelectronic revolution are first described, including the major breakthroughs in computer technology, the growth of information utilities, the automation of industry, and changes in value orientation. Then the impacts of the microelectronic revolution are analyzed with respect to each of the established national goals for education: economic efficiency, civic responsibility, self-realization, and effective human relationships. Significant issues include the need for higher cognitive skills, the problem of educational equity, the growth of electronically enhanced participatory democracy, and the need for anticipatory learning and continuing education. Finally, the implications for educational administration are discussed, including "contextual design elements"--the shift from a theoretical to a futuristic paradigm in administrative studies--and eight "action design elements": purpose reformulation, computer awareness for administrators, anticipatory policy-making, structural changes, interactive networking, epistemological reevaluation, moral/financial support for new learning, and experimental programs. (TE)

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A UCEA OCCASIONAL PAPER

MOVING EDUCATION AND ITS ADMINISTRATION
INTO THE MICROELECTRONIC AGE

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The Ohio State University

#8306

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INTO THE MICROELECTRONIC AGE

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MOVING EDUCATION AND ITS ADMINISTRATION INTO THE MICROELECTRONIC AGE

"When the oak tree is felled, the whole forest echoes with it; but a hundred acorns are planted silently by some unnoticed breeze."

Carlyle

Today when educators are under intense pressure to deal with the demanding present, those generating ideas about the future risk being perceived as bearers of irrelevant or unrealistic messages. Nevertheless, I am grateful for this opportunity to think with you about the future of certain aspects of education and leadership, and I am pleased that the sponsors and planners of this conference share my view that we need to search, even in the midst of present pressures, for a more adequate future vision.

Today we use the phrase "education in transition" because school systems reside between two civilizations. To borrow Daniel Bell's terminology, education finds itself between the descendent industrial revolution and the ascendent post-industrial revolution¹ or, in Toffler's terms, between the second and the third wave of history.² From this broad perspective we can view the clashes between ascendent technological forces and their counter forces and can identify some of the implications for education and leadership.

Given the "in-between" character of society, it is understandable that one of the most frequently heard refrains of the 1980's is the need to redefine the purposes of education. The following observation by David Tyack and Elizabeth Hansot illustrates the general refrain:³ "There is perhaps no more important task facing educational leaders now than the reformulation of the purposes of education."

Such expressions not only reflect discomfort with the ambiguities before us, but they also suggest that our current purposes are inadequate for education's altered and changing environment. The expressions also pose, by implication, some important questions about educational administration. For example, if the current purposes of education are unclear and/or inadequate, how can administrators implement school programs effectively? Or, can administrators be prepared in educational purpose-setting, and, if so, what are the implications for the study and preparation of administrators?

Such questions cannot be effectively addressed, in my judgment, until we achieve, through scholarly inquiry, more meaningful and up-to-date purpose statements--statements that can serve as bridges into the future. On this occasion I want to share with you some thoughts on this very complex problem and to identify selected implications for administrator preparation and study.

Since most of those born in 1982 will be graduating from high school in the year 2000, assuming our current educational structure holds, I shall use the time-frame 1982-2000 for thinking about education and its purposes. I shall make the optimistic assumption that three to five years from now the resources for education will be more plentiful than now; further, that there is an urgent need to begin developing ideas about new purposes, structures, and training for potential implementation.

As we look toward the year 2000, we might remind ourselves that futurism, like history, provides a perspective for understanding the present. It offers subject matter for generating and assessing the desirability of different policy and purposive alternatives. At its best, it can offer new vision along with ideas useful to leaders interested in inventing and implementing more promising educational futures.

The Microelectronic Revolution as a Dynamo for Change

Since the microelectronics revolution is the dynamo that is moving us from the industrial to the post-industrial society, I shall use it as a focus for analyzing educational purposes. Obviously, there are other perspectives for viewing the problem. However, I believe the focus is a fecund one, even with its limitations, for thinking about purposes. Since the immediate and most tangible products of the revolution are technologies that have already become controversial phenomena, the perspective also offers a mirror for examining the dark and the light side of microelectronic creations.⁴

The Microelectronic Revolution Defined

Before turning to the question of educational purposes, the concept of "microelectronic revolution" needs some clarification. To do this I will first focus upon some of the concept's revolutionary features. Significant in this regard are the major inventions that have shaped and are shaping the revolution. More specifically, in the forties, the first computer, called Electronic Numerical Integrator and Computer (ENIAC), was created by a team of 50 persons using 18,000 vacuum tubes; in the fifties, a quantum leap ahead in computers was achieved with the use of the transistor, followed by similar leaps in the sixties, with the integrated circuit, and in the seventies, with the microprocessor or the computer on a chip.⁵ In less than thirty years these inventions revolutionized microelectronics. An illustrative impact, spurred in part by the space race, is miniturization; today's technology, for example, could offer a trillion interconnections, the estimated number in the brain, in a space smaller than the brain, while ENIAC, which weighed 30 tons, would require a space the size of Greater London for the task.⁶ ENIAC's power requirement matched that of a locomotive pulling a train, as compared to

the energy of a burning lightbulb used by today's micro-computers. Reliability of computation has increased a thousand times, while the costs of computation have declined more than 99 per cent. According to Noyce, the co-inventor of the integrated circuit, the technology "is still far from the fundamental limits imposed by the laws of physics."⁸

We can gain insight into the technology of the micro-electronic revolution by comparing it with the technology of the industrial revolution. Significantly, the muscle power of human beings was extended phenomenally through the machines of the earlier revolution, while information and brain power are being enhanced remarkably by computer technology. This means that the recent revolution, as compared with the earlier one, is much more closely connected with the processes and functions of education.

The new revolution also demands much less energy. Its technology can turn wheels through the movement of electrons, while many industrial machines guzzle scarce supplies of oil and gas. This feature creates a powerful economic force and constitutes an important stimulus for the continued shift to microelectronics.

The new technology has evolved and spread much more quickly than the earlier technology. Masuda, for example, has concluded that the recent revolution has developed and spread many times as rapidly as the industrial revolution, depending upon the measure used. For example, by assigning to the four microelectronic inventions noted above a significance comparable to the steam engine invented in 1708 by Newcomen, the first railroad between Liverpool and Manchester in 1829, the first mass production assembly by Henry Ford in 1909, and the first jet engine in 1939, he established one measure for looking at the two revolutions. These latter developments took 229 years, while the same number of significant microelectronic inventions occurred in a period less than thirty years. The comparison does not assume that microelectronic inventions are at an end. Rather, new inventions of major significance can be anticipated as research and development continue. The tens of millions, for example, that are being invested annually in research on artificial intelligence, will certainly lead to new developments.

The Factory and the Information Utility as Symbols

The factory is typically seen as a symbol of the industrial revolution, while futurists believe that the information utility will be the symbol of the microelectronic revolution in the year 2000.¹⁰ Simply described, an information utility, in a mature form, would consist of many different data bases centrally stored in very large computers and countless computer-communication networks available interactively to individuals on a relatively inexpensive basis via homes, work settings, educational institutions, and other public and private agencies.

Some of the differences in the industrial and micro-electronic revolutions are inherent in the factory and information utility symbols. At the heart of the factory is the engine; at the heart of the information utility, the computer. The output of the factory is material goods; the utility, information. The factory amplifies muscle power; the utility, brainpower. The factory makes possible the widespread distribution and consumption of goods; the utility, the widespread distribution and use of information. The products of the factory are typically unrelated to education; the products of the information utility are intimately related. The factory separates production from consumption; the utility often joins production and use. One found new markets, historically, on geographical frontiers through the discovery of new continents and new colonies; the other, through discoveries on the knowledge frontier.

The problems frequently associated with the industrial revolution, generally stated, are unemployment in times of recession, machines that consume large amounts of increasingly scarce energy resources and seriously damaged environments. Problems linked to the microelectronics revolution have to do with large and chronically unemployed populations, inherent tendencies toward centralized control, and threats to individual liberty and privacy.

The viability of some of the concepts associated with the industrial revolution such as, for example, full employment and abundant energy resources, are increasingly under question. In addition, microelectronic technologies are changing the face of the factory. The automobile industry, for example, is being altered substantially through robotics. Robots controlled by master computers with capacities for memory, recognition, computation, understanding, and judgment, and with hierarchical links to other computers, make the automated factory a feasible development while posing to society's leaders a terrible dilemma.¹¹ On the one hand, the United States will likely become increasingly noncompetitive in international markets without the aggressive use of microelectronic technologies, including robots. On the other hand, if these are used aggressively, the probability of a growing population of chronically unemployed will be made much higher. Economic forces are strong, and the trends toward automating factories in such countries as Japan, Sweden, and the United States seem firmly set. According to Ruzic, the automated factory will be fully operational in Japan by 1990, and in the United States by 1995.¹² Masuda has projected that by the year 2000, such industries as electric power generation, iron, cement, and oil refining will require no manual labor at all.¹³

The speed of such developments in the United States will be influenced by the degree to which workers and management continue patterns of negotiation recently surfacing in the automobile industry, directed at lower

salaries and benefits but coupled with enhanced job security. A substantial slowing of the trend toward automated factories might also result from significantly rising trends in worker productivity or a shift away from the high value placed traditionally by society upon materials goods. However, the trend seems clearly established, even if the speed of its realization is not.

Manufacturing industries, which in 1947 provided 35 percent of nonagricultured employment and by the late 1970's, 24 percent,¹⁴ will continue to give way to the microelectronic revolution. Professor Reddy of Carnegie-Mellon has gone so far as to say that employment in the manufacturing sector will shrink from an estimated 25 to 28 million persons today to three million by the year 2010.¹⁵

What about the service sector of the economy, which scholars such as Daniel Bell have associated with the post-industrial revolution? In brief, the face of this sector is also being altered substantially by microelectronic technology. Banks, which are often viewed as conservative institutions, for instance, have not only changed their reporting, accounting, and related functions through computer-based systems, but they are experimenting with home banking and are also rapidly installing automated tellers which, in some cases, are functioning across state lines.¹⁶ Significantly, new service agencies that are predominantly driven by the new technologies are coming into being, for example, the relatively young Pizza Time Theater. We can anticipate that microelectronics will move much more deeply into the service sector during this decade, a sector which during the last fifteen years has employed a growing number of those who could not be accommodated in the industrial sector.

What can be said about the development of the information utility? Beginning prototypes of this phenomenon in this country are found in the private sector in such relatively young corporations as CompuServe, Dialog, and Source. Relevant public and public-private examples of utilities are found in the community information systems of Japan¹⁷ and Sweden and the video data systems of such countries as Great Britain and Canada.¹⁸ If you are one of those now linked to CompuServe with the appropriate modem, for example, you can for a fee now access different newspapers daily, a reference library on such topics as popular science, gardening, and US Government publications, a variety of business and financial data bases, information from a half dozen newsletters on computers, more than two dozen games, guidance and admission data for college-bound students, software exchange programs, and so on. In addition, CompuServe processes electronic mail for many different corporations and public agencies. Two professors with whom I am acquainted, one on the West Coast and one in the Mid-west, have used electronic mail in the joint writing of professional papers.

There are, of course, many data bases that can be added to information utilities in the future. Local, state, national, and international networks are expanding daily. In the next century, we will, according to some prognosticators, have full-scale global information utilities. Satellites already make possible certain international data bases such as, for example, those associated with defense needs, weather, and air pollution. Certain data bases such as, for instance, those associated with education, will be supported by public funds, although individual users will likely continue to pay a proportion of the costs for most of the data bases.

The functions to be performed via the utility are already transcending simple information exchange to encompass energy control, burglary protection, shopping, bill paying, and other activities. Developed information utilities will make more complex functions feasible such as, for example, the monitoring of cardio-vascular systems and the provision of certain medical services in the home, complex problem solving, opportunity finding, job seeking, invention, and knowledge creation.

In order for the information utilities to reach their potential, four general conditions will need to be met:¹⁹ central facilities equipped with very large computers, copious memory capacities, extensive data bases, and many program packages; availability of these facilities to the general public; user capacity to search or have searched pertinent data bases; and a sufficiently inexpensive fee structure to insure broad public participation.

Associated with information utilities will be new or altered industries. Already evident is the rapidly growing complex associated with the production and processing of information, including the production and selling of computer, telecommunication, and related equipment. Masuda predicts that this corporate complex will replace automobile factories as the largest industry.²⁰ Closely associated with this industry are the companies that concentrate upon software development and programming, printing, newspaper and magazine publishing, and other computer-centered activities. In addition, such public and private agencies as school systems, libraries, think-tanks, research institutes, and consultant firms will be increasingly linked to this growing set of industries.

Important stated ideals of the industrial society are full employment, higher standards of living, high worker productivity, and a prosperous, efficient, and growing economy. The ideals of the microelectronic society are more emergent and, therefore, less clear. Some ideals reflect negative reaction to industrial impacts such as, for example, those inherent in ecological ethics. Others are more indigenous to the microelectronic revolution such as, for example, the purposeful use of future time, active individual creation (in contrast to mass production), more effective use of information in rational action, and a not yet well defined commitment to globalism.

Microelectronics can also be understood by examining specific impacts on society of such varied products as satellites, interactive television, robots, computer assisted design and computer assisted manufacturing, word processors, consumer products with hidden computers, personal computers, and many others. The far-reaching impact of this aspect of the microelectronics revolution cannot be accommodated in this paper. Suffice it to say that under such bristling technical terms as "photomasks," "port selectors," "data concentrators," "transponders", "multiplexors", "array processors," and "modems,"----all associated with the developments just noted----lie deeper meanings. These have to do, for example, with the creation of very different relationships between human beings and machines than those of the industrial revolution. Some of those bearing upon education will become more explicit in the discussion of purposes, a task to which we now turn.

The Reformulation of Educational Purpose

The last nationally oriented study of educational purpose was published in 1938.²¹ Four fundamental purposes were recommended to guide educators in this study: self-realization, economic efficiency, civic responsibility, and effective human relations. I shall use these purposes as a framework for thinking about education for the future. This decision is based upon the assumption that the major challenge today is to give new meaning to established purpose statements rather than to formulate new ones. While the possibilities for elucidating new meanings are rich, I can offer in a brief time only illustrative and selected meanings.

Economic Efficiency and the Purposes of Education

In examining the purpose of economic efficiency as well as self realization, civic responsibility, and effective human relations, I shall narrow my analysis to the phenomena of technology and societal values and to some of their contrasting expressions within the industrial and microelectronics revolutions as noted above. Understandings pertinent to these phenomena can help pinpoint significant issues and problems that have import for purpose definitions.

If education is to contribute to economic efficiency during the 1982-2000 period, then what are purposive implications for schools? An obvious implication is that employment opportunities in the year 2000 will be shaped largely by the microelectronic revolution and only in limited ways by the industrial revolution. Some of these opportunities are already apparent and will simply increase in number during the next two decades. The most rapidly growing job opportunities during the decade ahead, according to the Bureau of Labor Statistics, will be for computer repair personnel.²² There will also be very high demand for microelectronic engineers, computer systems analysts, computer

operators, and office machine and cash register servicers. Computer programmers, who can confront the growing gap between hardware capacities and software availability, will also be in very high demand even though computer programs are already being devised to write other programs.

As the industrial and service sectors increasingly succumb to automation trends, the microelectronic revolution will produce new employment opportunities, most of which cannot be clearly foreseen. Currently, for example, major investments are being made to produce computerized consultants, and at least fifty of these systems, which are concentrating on such problems as medical diagnosis, customized computer assemblage, and oil discovery, have already been developed.²³ These products and others emanating from artificial intelligence research are illustrative of what is on the horizon. Thus, education will need to re-orient its guidance, counseling, and learning experiences to the rapidly expanding job demands already evident as well as new ones to be spawned by microelectronic technologies.

As already noted, there are good reasons for believing that chronic unemployment will grow in the future. Since more and more of the simpler and more routine functions in work places will become automated, this means that those performing the remaining functions will need relatively higher cognitive skills, a consideration which education will need to integrate into its purposes.

The large underclass already present in society will likely grow unless society creates and implements major interventions. Since more and more of the simpler and more routine functions in work places will become automated, this means that those performing the remaining functions will need relatively higher cognitive skills. This condition poses a major challenge to those concerned with the purposes of schools. Computer literacy will need to be developed within this group, but that will be only a beginning point. Given the growing trend toward a greater proportion of non-routine jobs and more frequent career changes, education will need to concentrate more on the development of basic skills, general understandings, and adaptive capacities. Since the new technology will be pervading the industrial, service, and microelectronic sectors, it will likely be more feasible to give students a firmer grasp of its essentials than was the case with the more varied technologies of the industrial revolution. Given the close relationship of the new technology to information, a grasp of essentials by students should produce positive educational benefits. Concentration upon more general learnings will mean that the private sector will likely be assuming more responsibility for the specifics of worker training than in the past.

Systematic studies of career and vocational educational programs would undoubtedly show that they reflect much more the agricultural and industrial waves than the microelectronic wave of history. This condition will succumb to change as

the microelectronic revolution unfolds. Commissions composed of private sector, public sector, and educational leaders are already addressing pertinent issues in some metropolitan areas. The private sector will likely assume greater responsibility for training and re-training, while the school and associated agencies concentrate more on developing basic and generalizable skills.

Since the American economy is being increasingly challenged by other nations, especially Japan, there are implications for education's role vis-a-vis economic efficiency that go beyond vocational and guidance experiences, and which transcend national boundaries. Since the Japanese have established a number of goals, which if attained, will place them in dominant positions in many sectors of microelectronics,²⁴ there is a critical need for highly selected and well-prepared specialists such as scientists and engineers. In addition, the United States, as compared with other nations, is lagging far behind in language training, in a world that is more and more globally oriented.

The United States has provided a large majority of the creative inventors, engineers, and scientists who have made the discoveries that made the microelectronics revolution possible. Schools and institutions of higher education deserve much credit for their roles in this accomplishment. However, since past efforts will not be sufficient to ensure a future leadership role for the United States, a special issue bearing upon the present purposes and programs of schools is created. If math, science, and language programs are not improved, the probability is increased that the United States will surrender more and more of its economic leadership role internationally.

Given such trends as increased part-time work, shortened work weeks, extended periods between the loss and acquisition of jobs, more frequent career shifts, and chronic unemployment important questions about education for leisure arise. One specialist, for example, has projected that in the 21st Century people will be involved more in leisure than in work and that leisure will serve as the central focus of our lives.²⁵

The functions of leisure in the industrial revolution have been described by Kaplan as "therapy, rest, relaxation, social control, recreation for subsequent productive effort."²⁶ Leisure, in other words, has had a predominantly instrumental character. However, this consumer based idea of leisure, as it encounters scarce energy and other resources and as more time to be consumed becomes available, will likely become less appropriate for the future. The Greek concept of leisure as time for development may assume a larger role. Development can have many expressions and many forms as, for example, physical, cognitive, intuitive, emotional and spritual. The individual will likely participate less in renewal activities preparatory to entering the work environment, and more as an initiator, a learner, or a creator. This concept, which is also related

to self realization, discussed below, could, if implemented, encourage a greater search for solutions to the individual and social problems that will pervade tomorrow's environment.

Civic Responsibility and the Purposes of Education

Those who have written about the impact of the micro-electronics revolution on political decision-making have coined such terms as "electronic democracy" and "teledemocracy." During the last eight years in various countries, leaders have carried out experiments in democracy using the new technology. Canadian leaders implemented in 1978-79 the Talking Back Project, in which large numbers of citizens from coast to coast expressed their views with the aid of electronic media on topics of national concern.²⁷ In 1981, New Zealand, through its Commission for the Future, initiated Televote, which used a network of three university centers from which the views of thousands of citizens were obtained via radio, telephone, and newspaper questionnaires, backed up by computers.²⁸ From 1974-76, in the state of Washington, Governor Evans initiated the first large-scale experiment in teledemocracy through the Alternatives for Washington Project, in which hundreds of thousands of citizens participated through public TV, random sample polls, public meetings, and other media²⁹ to express their views on potential long-range futures. Through interactive cable TV, pioneered via QUBE, in Columbus, Ohio, thousands of citizens have expressed their views simultaneously from their living rooms by the push of a switch, on items ranging from presidential speeches to food labeling practices.³⁰

Ted Becker examined experiments in teledemocracy and concluded that there are two types, which he labeled Television Talkback and Public Participation.³¹ The latter includes a blend of face-to-face meetings and the use of varied electronic media. In the former, citizens offer their views on structured issues via electronic media, but do not have as much opportunity to select and structure the issues as do those in the public participation type.

Already, technologies tested in various countries are to a point where they could be combined, with adequate resources, to encompass both types. Let us assume, for example, that a school board in a major city in 1998 should decide to use relevant media for broad-scale citizen participation in policy development on an issue not now easily foreseen.

First, the nature of the problem might be described and transmitted to the citizenry through a videotaped documentary supplemented by teletext on television screens, electronic mail via information utilities, and cable television with interactive capabilities. By using interactive cable, citizens could then acquire additional data as desired and as available. In addition, they could use computer conferences or neighborhood meetings to arrive at their solutions.

Promising ideas developed by citizens for solving the policy problem could be transmitted to the school board via information utilities and then the utility could structure the information into alternatives that could be communicated back to citizens via electronic mail or other means in order to obtain rapid feedback. A narrowed list of policy alternatives could then be developed, using the feedback obtained which could provide the base for a school board meeting. Speaking at the meeting could be those present as well as citizens in their homes communicating via television media or offering advice via computer-based electronic messages. The issue could be resolved after appropriate discussion via a televote or a vote by school board members.

From this simple and somewhat overdrawn example, several observations can be made concerning potentially positive effects of teledemocracy. First, citizen participation in the definition and resolution of political issues can be broadened. Since the costs of time and the costs of travel for individuals to attend meetings can be sharply reduced, this should enable more citizens to participate in decision making from their living rooms.

A second advantage stems from the increased scope of pertinent information. Localities will likely be able to be linked to other localities and to regional and national information resources in an increasing number of decision situations. In addition, information will be available through a greater variety and range of media. Finally, it seems reasonable to assume that information bases in decision-making, at least in certain types of problems, will be potentially richer and more up-to-date. All these factors related to scope mean that citizens can be better and more broadly informed in their decisions.

A third advantage of teledemocracy derives from greater speed in information transmission and processing, given the new technology's capacity to handle copious amounts of information quickly. Certain types of decisions, then, can be made faster and at the same time be better informed. Thus, it is understandable that evaluation of experiments in teledemocracy indicate that citizens are eager to participate and that they are enthusiastic about the results.

To be sure, there will be problems--a major one being that of representing pertinent information fairly and accurately. Another will be equity of participation as, for example, those without adequate access to media or training systems, or those who speak languages other than the dominant one. Another major problem, already clearly demonstrated by experiments in different countries, is that current political structures have great difficulty in responding effectively to citizen recommendations and decisions.

Given the problems and possibilities inherent in "electronic democracy," what is implied for education vis-a-vis the purpose of civic responsibility? Among other things, education will need to develop in students the capacities needed (1) to alter 20th Century political

structures to meet 21st Century needs; (2) to defend and nurture fundamental democratic values now being threatened by the electronic revolution; and (3) to achieve higher levels of visioning than past generations have acquired.

In shedding light on changing political structures, we might observe that there will likely be growing stress between representative decision-making and broad-based decision-making via teledemocracy. How will representative decision structures accommodate the televote, for example? Under certain circumstances will televotes be perceived to be more legitimate than legislative votes? Realignment in the political structure to facilitate greater citizen participation will likely be required, with attendant shifts in the political roles and responsibilities of the people and their representatives.

A related issue concerns the relationships between centralization and decentralization in information processing and decision-making. The question of which relationships should adhere between centralization and decentralization in differing contexts is at the center of the microelectronic revolution and will remain there. Fortunately, the development of microcomputers, distributed information systems, interactive cable, and other media has made substantial decentralization possible and has provided corrective mechanisms for excesses in centralization. Citizens in the future will need to be vigilant about what centralization-decentralization relationships to maintain in order to protect individuals and to maintain a vibrant society.

A final example of where changes in structure may occur concerns national-global relationships. Already, there are those who see the "nation-state as a doomed relic of the past."³² However, the nature of desirable and feasible realignments in relationships is not yet clear by any means. If more effective realignments are to be achieved, structures will need to be created to enable citizens in many nations to address national-global issues.

The creation of new structures to facilitate greater citizen participation in political decisions through a more global orientation to problems and effective decentralized support systems is not without risk. Effectiveness will be dependent upon the education future citizens receive. Therefore, schools will need to develop understandings of issues of structural stress and change and how these relate to the effective performance of civic responsibilities.

Another task to be encompassed within the purpose of civic responsibility is that of defending and nurturing fundamental democratic values now being threatened by the microelectronic revolution. Two of the more obvious illustrations, one associated with individual privacy, and the other with equity, will make the point clearer.

John Wicklein, in his book, Electronic Nightmare: The New Communications and Freedom, has written thoughtfully and knowingly about what he sees³³ as a "clear and present danger," which he states as follows: " . . . and for almost every

blessing these technologies bring, they pose a danger to our individual liberty and our privacy." By carefully assessing responses to the general issue in such countries as Sweden, Great Britain, Brazil, Canada, Japan, and the United States, he pinpoints the problems inherent in computer assembled dossiers used by credit and employment agencies, the control by a single authority of content disseminated through mass media, the monitoring via computers of individual patterns of TV viewing such as, for example, pornographic movie viewing and the storing of this information on computers, and so forth.

The microelectronic revolution and events associated with it pose serious problems related to equity. As already implied, these relate to different facets of the problem: inequitable access to the political process, inequities in computer availability to support learning, and the creation of a larger underclass in the social structure.

There is reason to be optimistic about citizens' abilities in the future to confront effectively issues of personal privacy, human equity, and other fundamental values now at risk. However, this optimism implies a faith that education will ensure that future citizens acquire the understandings and attitudes needed to discharge this important facet of their civic responsibility.

Today there is concern about what has been called the "failure of vision" in our society. Our capacities for visioning are underdeveloped in a period of immense, if not unprecedented, change. Even those elected to represent the people are known more as validators than as innovators.

As society moves from the industrial to the electronic society and as individuals have a greater opportunity to participate in political processes, educational leaders will need to find more effective ways of nurturing political foresight in students. While the task will not be easy, it is a fundamental one. Without vision, especially in great periods of upheaval and uncertainty, the people and their democratic institutions cannot continue to thrive.

In sum, the coming decades will contain new political risks and will bring new tasks to those exercising civic responsibilities. Education will need to link its programs to these new responsibilities. Illustrative civic responsibilities that need special attention in education have been suggested: realignments in political structures and processes, the nurturance of fundamental values now threatened by the microelectronics revolution, and the development of greater visioning capacities.

Self-Realization and the Purposes of Education

Historically, the home has been an important early-life context for nurturing self-realization. This context will continue to be changed by the microelectronic revolution. Before the year 2000, personal computers will likely be as widespread in homes as TV sets are today. Already there are

more than 200 computer networks, many of which are accessible to home computers and some of which are international in scope. Many homes, some forecasters project, will have computer communication centers where a wide variety of educational, entertainment, clerical, research, political, economic, and other electronic-driven activities will transpire.³⁴ The trend, already under way, for secretaries, computer programmers, and others to work in home settings with electronic links to offices will continue. If research solves problems of robotic vision, the more affluent homes could possess robots that will perform as bartenders, cleaners, dish washers, lawn mowers, and in other roles.³⁵ There is a reason to believe that homes themselves will have the artificial intelligence to respond to stimuli in their environment such as, for example, burglary attempts, alterations in outside temperature, overheated appliances, unused lights, leaking roofs, and so forth.³⁶ The emergent computer-communication environment in homes will represent a new context for affecting self-realization.³⁷

Self-realization, according to the American Heritage Dictionary, is the "complete development or fulfillment of the self's potential". Self-realization, then, is achieved through the full expression of individual talents.

While the concept of self-realization points to the individual, it cannot be pursued separately from societal contexts. The effective control of the microelectronic revolution, in other words, will be dependent upon developed individuals. Only they can assure that a positive story on the microelectronics revolution is written. Perhaps self-realization in the future will be linked more closely with the solution of human and societal problems than in the past. Certainly, society will offer unprecedented opportunities for the expression of human talent directed at human services. Assuming that relatively less value is placed upon material goods and relatively more upon information and conceptualization, individuals will have a greater stimulus than previously to develop more fully their intellectual talents.

Historically, basic literacy skills have been considered essential tools for self-realization and, as already implied, these will be even more important in the microelectronic than in the industrial era. Not only will the need exist to improve school effectiveness in helping students acquire these tools, but also a new need must be added to the educational agenda, namely, computer literacy. Systematic conceptualizations of computer literacy are already being produced, and such organizations as Minnesota Educational Computing Consortium are developing computer-based programs for teaching literacy.

Computer literacy, like language literacy, suffers from ambiguities of meaning. It was viewed initially more in "how to" terms such as, for example, how to use a computer to acquire and to process data. The assumption was that if

citizens are to reap the benefits of computers in a science-driven society, they must be able to use them. During the last decade more encompassing definitions have evolved including, in addition to "how to" skills, understandings of how computers affect different roles in society, and the impacts computers are having and will have on society. Computer literacy can be broken into such instructional topics as hardware, applications, social effects, limitations, software, programming, and the affective dimensions of computer use.

As schools develop computer literacy, their leaders will confront new meanings related to the long-held goal of equality of learning opportunity for all. We are aware of inequalities in opportunity related to past efforts to achieve language literacy that have affected the poor, the minorities, and others who have not had access in their homes and neighborhoods to books and relevant learning environments. Since home computers and the accessories needed to use them, at least for the foreseeable future, will cost substantially more than books, inequalities of learning opportunities for the underclass may be more marked than in the past.

Educational and other leaders need to address the potentially very negative effects of the microelectronics revolution on equal opportunity and to develop needed interventions. Diverse approaches to the problem need to be operationized and evaluated. A few illustrations will clarify the point.

The estimates vary, but it is likely that about 15 percent of the schools already have micro-computers, and the number is growing rapidly, even in a period of severe economic constraints. Most of those in school who are now proficient in the use of computers are students, a condition that implies one possible intervention: keeping computer centers in schools open for certain specified hours outside the school schedule, and staffing the centers largely with the students, with some adult supervision. Students would teach other students aspects of computer literacy, especially to those who do not have access to micro-computers in their homes.

A second idea would involve the development of centers in disadvantaged neighborhoods with needed equipment and with voluntary mentors who would be available at times, complementing the school schedule. Such a service, in some cases, might be linked with the "hi-tech" oriented schools now emerging in such states as California and Minnesota. In other cases, the centers might be sponsored by voluntary community agencies or by city agencies and receive support from the private and/or public sector.

A third idea would be government subsidy and/or tax credits to the private sector from state or federal agencies to enable those below stipulated income levels to acquire home computers for use, and to have voluntary training support systems to enhance literacy development. Again, the

training via the latter might be carried out largely by students with adult support.

Future students, as they acquire computer literacy, will have a new tool to supplement language literacy. However, language and computer literacy, as tools, will be insufficient to ensure self-realization. Their manner and focus of use will be crucial considerations. Some suggested foci will be offered at this point.

One illustration related to self-realization is anticipatory learning, a concept elaborated in the second Club of Rome report.³⁹ This type of learning requires that relatively greater attention in learning be given to future, in contrast to present and past events, and to the development of capacities⁴⁰ for experiencing "vicarious" or "envisioned" situations. Such an orientation to learning is needed

because the microelectronics revolution and other societal developments have created very unpredictable environments that require individual flexibility and adaptation to new conditions and to new alternatives. The complexity of events generated by societal change has reached such levels that proactive behavior and anticipatory learning are much more positive strategies for developing human potential than reaction or maintenance learning. A related factor is that future shock during the coming decades will likely increase and become potentially more detrimental. If individuals acquire more effective anticipative skills, shock can be diminished. In a more positive vein, anticipation is necessary for invention and innovation--challenges that will provide rich opportunities both for self-realization and societal realization in the future.

Anticipatory learning involves the development of other qualities necessary for the fulfillment of human potential such as, for example, initiative, venturesomeness, independence, and flexibility. If learning is linked to invention or innovation, creative behavior can result.

In the coming decades, the various elements of anticipatory learning will need to be conceptualized more explicitly and operationized in instructional situations. If we think of the computer, for example, there is a tendency to lock students into computer programmed activities that require reactions within pre-determined space and time frames, an orientation that is antithetical to the development of initiative, independence, venturesomeness, and creativity. Greater priority will need to be placed upon providing opportunities in which students develop their own programs.

The information associated with the microelectronic revolution is noted for its cognitive character, in the sense that it is logical and relatively objective. Analysis is central to its development. Given the force of the electronic revolution, there is a danger that the use of cognitive information will be over-emphasized in education. Put differently, in the press to use the language of math, logic, and science, there is a danger that the modes of

thought in poetry, literature, art, history, and music, which deal with the human and affective aspects of experience, will be pushed into a secondary educational role. In addition, as computers are pressed into service to teach humanistic studies, the emphasis is inevitably upon the cognitive at the expense of the affective. Education needs to counter these tendencies with equal opportunities for students to experience and understand content from the humanities.

As civilizations have moved from the agricultural to the industrial and to the microelectronic stage of development, the scope for viewing problems has continually expanded. Thus, it is understandable that the term "world problematique" is associated with the microelectronic revolution.¹¹ Those in the future who fully realize their potential will be able to conceive and confront problems within a format that frequently transcends local and national contexts. This will be true not only for physical problems such as food shortages, energy limitations, and polluted environments, but also for cultural problems such as, for example, human equity. Education will need to encompass this concept in its programs to develop self-realization.

In all approaches to education for self-realization, the concept of human equity will need to be honored. Since the purpose of self-realization was articulated in 1938, new developments have affected our views and our understandings of equity. Concepts of human potential for females, for example, have been altered substantially by the women's revolution, which has helped create for many a much larger vision of human potential. Education needs to recognize the new and larger vision for the role of women in society and to develop its programs and standards to nurture talents to match the new vision. The same can be said for other groups.

Effective Human Relationships and Educational Purpose

The microelectronic revolution, as already implied, is creating new relations between human beings and machines. The scope of traditional relations between industrial machines and people is shrinking, as robots and other types of automation take over routine functions, and as the industrial sector itself assumes a relatively smaller size. On the other hand, relationships between people and computer-communication machines become much more extensive, as these machines pervade more and more the industrial and service sectors, and as they assume center place in the micro-electronic sector. These machines, in contrast to industrial ones, have entered the life space of professionals such as, for example, researchers, physicians, engineers, lawyers, and architects. Since the new machines produce information products, the relationships between human beings and machines require more sophisticated mental operations than formerly, not only from professionals but also from workers generally. This is true even in relations

involving the acquisition and consumption of information, especially in interactive human-machine relationships. Extremely complex intellectual demands are placed upon those creating software systems to enable machines to function at ever higher levels.

What do the new relationships between human beings and machines mean for human relationships, and what are the implications for educational purposes? Some, for example, are concerned that the microelectronics revolution will create machine-hermits or stay-at-homes with very limited human contacts. However, we need to remember that such concepts as "bookworm" and "TV addicts" preceded the computer. In other words, new machines, we assume, will not alter fundamentally the marked needs individuals have for human affiliations, although there will be those who deviate from the norm. Perhaps one of the major reasons schools or institutions similar to them will survive the microelectronic revolution is the deep and pervasive need that youth and adults have for interpersonal relations.

The evidence is not clear or definitive about how computers and related equipment in schools and homes will affect social relations. Some maintain that computer centers in schools occupied by students are lively places for interchange, and that computer communication centers in homes stimulate greater family communication. There also seems to be a tendency for those who work independently in homes with electronic links to offices to affiliate more closely with those in their immediate neighborhoods. Whether or not enhanced patterns of interaction are a function of novel situations or of more stable influences is not yet clear.

There is also the view that the computer highlights individual thinking and experience and that the resulting exchange among individuals in schools is less fraught with human competition. An even more radical view, advanced by Papert and others, is that the computer will eventually be an unprecedented equalizer of human beings and that hierarchical relationships between teachers and students will eventually disappear.⁴² This argument assumes a much greater capacity on the part of computers than they presently have, including more data banks, more sophisticated software, and higher degrees of artificial intelligence. It also assumes very different behaviors for teachers and, in turn, for principals.

If we agree that the school will continue to be an important setting for socialization and for the meeting of affiliation needs, what can be said about other dimensions of human relationships that have implications for the purposes of education? A few illustrative dimensions will now be delineated.

The new revolution will continue to create much human stress as individuals confront major changes in their environments such as, for example, secretaries⁴³ in settings being transformed into offices of the future or teachers

whose functions are being impacted significantly by what many understandably perceive to be a strange new technology. Such developments will not only bring major shifts in job functions, relatively frequent career changes, and substantial retraining for new functions or positions, but also increased interpersonal tensions between managers and the managed. The stress experienced by youth, which is already very great, as indicated by the sharp rate of increase in suicide rates during the last decade, will be marked as they enter adult roles. Can and should education equip students to deal with future shock in ways that will make for less harmful stress? This question seems worthy of exploration as we look toward the 21st Century. Perhaps schools themselves could become microcosms for innovative and fruitful learning with regard to interpersonal stress.

Given the tendencies inherent in the microrevolution toward the creation of an even greater underclass than already exists in society, schools will need to develop understandings about the nature of the human inequities now being reinforced and aggravated. In addition, the development of insight into commitments to the continued pursuit of the democratic ideal of equity would seem very significant, as already emphasized. An example of how students can be involved experientially in equity problems was given earlier in discussing equal opportunity for all to acquire computer literacy. With the likelihood that more and more adults will have more and more free time in the future, the possibilities for equity-related activities pursued by adults or youth singly or in cooperation will be immense. Educators will have unique opportunities for developing understandings about human inequities and for encouraging independent learning activities directed at the amelioration of inequities.

Summary

In sum, then, education finds itself in transition and in between the ascendant microelectronic and descendent industrial revolutions. Because education is in-between, its purposes are ambiguously linked to both revolutions, and a growing number of leaders and scholars are pointing to the need for greater clarification of purpose. The question is posed as to how those leading schools can effectively help establish priority programs, if education's purposes are unclear or inadequate.

In this paper, illustrative differences in the values and technologies inherent in the descendent and ascendant revolutions were delineated in order to provide a specific base for thinking about educational purposes. In thinking about those who will spend their adult lives in the 21st Century, we have used four well-known purposes articulated in earlier decades: civic responsibility, economic efficiency, effective human relationships, and self-realization. Illustrations of new needs being created by

the microelectronic revolution and of their relationships to each of the four purposes were delineated. Relationships between emergent needs and fundamental democratic values were also noted.

Implications for Administrator

Preparation and Study

Some believe that technology is a powerful and blind force whose negative consequences are uncontrollable. We assume that microelectronic technologies bring new potential as well as new danger and risk, and further, that leaders can identify potential and danger and can help develop the former while diminishing the latter.

Clues about positive potentialities and negative consequences and their linkages to important educational purposes, offered in this paper, represent a very small step toward what I view as a needed and extended leadership adventure. The adventure would be designed to give technology eyesight and education new meaning and expression.

Even a small step into the future can provide perspective and help us focus more sharply upon an extremely important question: namely, what changes will need to be achieved in administrator inquiry and preparation between now and the year 2000 to ensure an effective educational passage into the 21st Century?

Masuda has coined the term "futuraization," which he defines as "actualizing the future" or "bringing it to reality."⁴⁴ The concept does not imply the prediction of the future but, in a real sense, its creation. He describes a phase of the task picturesquely as "painting a design on the invisible canvas of the future."⁴⁵ Unless we achieve such a design, it will be more difficult to aggregate resources and to achieve concerted study and action. Put negatively, events are clearly whispering to use that a "muddling through" strategy directed at protecting our immediate interests is not viable for the long-range and for the healthy development of educational administration. What, then, might the outlines of a two-decade design look like? In addressing such a large question, I can only offer some clues for consideration. Before pinpointing some action elements for a design, let us identify some contextual clues by looking at where we are in relation to ideas presented earlier in this paper.

Contextual Design Elements

First, we might note that the last major shift in the direction of preparatory programs and inquiry was in the 1950's, when the industrial revolution was at its zenith and the microelectronic revolution was on its first legs. Labeled by Andrew Halpin as the "new movement," the shift has propelled us substantially beyond the work of such earlier giants as Sears, Mort, Mohlman, and Reeder, just as their scholarly work, which began in the 1920's, moved the field ahead in very visible ways.

During the last three decades, such ideas as the use of theory to guide research, hypothetico-deductive systems as exemplars of theory, the incorporation of the social sciences into preparation and inquiry, the adoption of the administration qua administration assumption and the separation of the "is" from the "ought", all associated with the "new movement, have offered very fruitful guides for a wide array of new developments. These developments have significantly changed our field. Interestingly enough, however, the movement today is no longer a force for change; rather, its role has shifted to that of a conserving force.

In addition to providing us many new developmental arrangements and experiences, the new movement brought professors excitement and new opportunities for learning. One class of learnings provided insights into the limitations of the core ideas which shaped the "new movement." Just as some of the assumptions underlying the industrial revolution have been called increasingly into question, so have critical assumptions underlying the theory movement. While we were busily engaged in developing our field on a given course, major changes in society's values and technologies have created an uncomfortable mismatch between administrator preparation and societal needs for leadership. Our learnings help us see more clearly that the programs of yesteryear are showing signs of obsolescence and that without alteration they will become increasingly passe as we move toward the year 2000. Consequently, more of use today than a decade ago can appreciate Whitehead's admonition: "A science which hesitates to forget its founders is lost."

The major emphasis of recent decades has been on administrative behavior and functions and on organizational processes. At a time when society was undergoing revolutionary change, our field was producing volumes and volumes on the processes of change, while largely ignoring the substance of change. The concept of administration qua administration has re-inforced this stance, since it assumed that the unique missions and purposes of organizations were not very significant in administrator preparation and study.

Thanks to the Greenfield-Griffiths and associated debates, we have gained greater understanding of the new movement's presuppositions about the nature and validity of knowledge. Other alternatives to the logical positivistic tenets of the "new movement" have surfaced, including those inherent in phenomenology and critical theory.⁴⁶ While we have gained perspective on epistemological issues during the last half dozen years, we have not yet defined a new orientation for the field, although there is a beginning search for new formulations.

In the larger society, a relatively new approach to knowledge has clearly emerged and has grown markedly since the 1950's. More than previous approaches to knowledge development, this one, called futurism, is much more closely allied with values inherent in the microelectronics revolution such as, for example, the purposeful use of

future time. Its modern expressions have been influenced by such leading humanists as the tough-minded Bernard DeJouvenal⁴⁷ as well as the scientifically oriented and enthusiastic Erich Jantsch.⁴⁸

This orientation to knowledge has attracted a growing number of scholars from varied disciplines during the last two decades, some of whom have written extensively about the microelectronic revolution. Those who monitor the literature of this new orientation would likely agree that its scholarly output has improved both in scope and quality. It offers, I believe, one of the most perceptive sources of value analysis available to those interested in longer-range perspectives. While I am not aware of systematic work directed at this literature's epistemology, more than 100 methods used by futurists have been described by one author.⁴⁹

Futurism's potential for our field has not yet received serious and widespread assessment--in part, perhaps, because it is a radically different alternative to that represented in the theory movement. However, my own experience leads me to believe that societal and professional climates have become increasingly supportive of futurism during the last fifteen years. For example, it was a school superintendent three years ago who successfully argued that the mission of the U.C.E.A. University-School System Partnership should be that of research and development directed at helping leaders anticipate and manage the future.

As we look at our present context, then, and at its relationships both to events since the 1950's and to powerful trends taking us into the future, we can conclude that administrator inquiry and preparation, like education, is in a state of transition. I shall conclude by offering some action design clues for your consideration.

Action Design Elements

1. One of the reasons, as already implied, that our inquiry and training are oriented more to the past than the future is our neglect, and the more general neglect among educators, of societal change and educational purpose. The time is ripe to ally ourselves with other interested scholars and leaders to give new meaning to education and leadership through the reformulation of purpose. Purpose reformulation will need to be linked to assumptions about the "good" society and be derived from needs and risks being created by societal change, one expression of which is the microelectronic revolution. Reformulations can help lead education from its current transition state into a new era. Our past posture of separating education from administration is an inadequate future-guide. The current crisis in education stems to a considerable degree from a lack of well defined, compelling, and legitimated purposes.

2. Since educational administrators will have unique opportunities to translate purpose into action programs in schools, their preparation will need to make them more literate about the nature and consequences of the microelectronics revolution and the problems, issues, and opportunities this revolution is creating for schools. Only if they obtain computer literacy in the broadest sense will they have the understandings needed to lead in the clarification of purposes and the generation of new programs to serve individuals and societal needs in the new environment of the 21st Century. This can happen on a broad-scale basis only if professors change preparatory programs, develop new perspectives for synthesizing knowledge, and undertake new inquiry endeavors.
3. If schools are to realize anticipatory learning for students, more and more educational administrators will need to acquire and demonstrate skills, understandings, and attitudes for operationalizing the concept in their own behavior. As they model this behavior for teachers and students, the climate for realizing anticipatory learning in schools will be improved. As already noted, societal events are pressing us all to adopt more of an anticipatory stance. However, preparatory programs can abet this development through recruitment emphases and the creation of opportunities for trainees to acquire skills and understandings supportive of proactive learning.
4. The microelectronic revolution by the 21st Century will have changed not only political, economic, and social structures but also educational structures. Some go so far as to suggest that education will be freed from its traditional locus of schooling and will be centered in electronic links with an infinite number of data bases and informational and human networks. Because of the radical behavioral and institutional changes implied by such a development, we can be very skeptical about its realization by the 21st Century. However, there seems little doubt that there will be substantial changes in how schools are structured internally and externally. Should we not begin the search for positive changes in structure by examining pertinent issues? For example, what changes in school-home relationships will be needed to enhance education as the number of home computers rapidly expand and as they become linked to libraries and to information utilities, and as they have available a growing supply of software programs in subjects ranging from foreign languages to math? Or what will the expansion of computer-managed instructional

programs mean for changed administrator-teacher-student-parent relationships? Can school districts capitalize on microelectronic media in ways that will ensure the unique advantages inherent both in centralized and decentralized information systems, and that will also effectively serve administrators, teacher, and students while protecting individual privacy? We can let technology and its exponents answer these questions as we move toward the 21st Century or we can launch systematic inquiry to diminish technology's blindness and to arrive at reasoned views about needed new structures. Is not the latter course the better one?

5. As continuing education for administrators assumes more and more significance, we will need to test various uses of microelectronic media for delivering this type of education. Already there are available various media that are waiting to be used and evaluated. As we produce new knowledge about education's emergent environment and its implications for purpose, how can satellite conferences, for example, be used to reach educational administration in dozens of districts and communities simultaneously and how can such conferences be followed by meaningful developmental experiences at the school level? In Germany and other countries today, there are experiments in so-called "distance study" in which independent study modules and field-based seminars are used. What significance will electronic mail and electronic conferencing have for these and related endeavors? Or, at another level, what kinds of electronic messages might best be shared by and among principals in large metropolitan areas and what does this imply for developmental and evaluation efforts?
6. The most probing question we can ask as we look toward the future has to do with the presuppositions we hold and/or should hold about the nature and validity of knowledge, since such presuppositions will shape fundamentally both inquiry and program outcomes. Most of the alternative sets of presuppositions we now have before us were developed earlier in this century before the microelectronic and other revolutions emerged. If we believe that society is changing in basic ways and if we accept Aristotle's view that knowledge has an essentially social character, we could conclude that while there are useful elements in current alternatives, none of these is adequate; therefore, a new epistemological formulation is in order. We face a choice, then. We can leave our presuppositions implicit or we can seek greater awareness and understanding by making them explicit. I suspect

- that this question will not go away and that scholars within the next two decades will opt for the articulation of a new set of presuppositions.
7. As we contemplate the changes that are implied by the above statements, both in society and in our profession, we can see not only the potential excitement inherent in the needed regeneration of our field but also the magnitude of the learnings we will all need to acquire to respond effectively. Where can we get the moral and financial support required? Where can we find or create the opportunities needed to advance our learning? How can we cooperatively order and confront new priorities? Would such questions be appropriate for U.C.E.A. governing bodies to address in formulating a 1984-1989 plan?
 8. Since we still are clearly in a state of transition, substantially altered programs are not likely to emerge soon. Possibly, a smaller number of institutions of higher education will lead us from today's transition state by creating programs systematically designed to prepare leaders for education's new environment. Another possible scenario is that a range of institutions will work on specific and partial elements during the eighties and that these will be synthesized into new inquiry and training efforts by leading institutions in the nineties.

Conclusion

We have choices to make and developments to undertake, then, which the largest computers and the most advanced artificial intelligence systems produced by the microelectronic revolution cannot handle for us. Only the highest levels of human scholarship, imagination, commitment, and leadership can. If this condition fills us with awe, we might remind ourselves of the significance of the processes required and the outcomes projects. The processes, if effective, will bring new excitement and vitality to our field. And those leaders in institutions who produce outcomes in the form of needed post-industrial training and inquiry patterns will make a contribution to education, leadership, and society of immeasurable short- and long-range significance. For society's stakes in education are very high as we look ahead, given the dark image of an Orwellian automated state, on the one hand, and the bright image of a more informed, humane, and globally oriented democracy, on the other. The tenet that education represents the keystone in the arch of democracy, eloquently articulated by our forefathers, assumes new significance as we move toward the 21st Century. So does the recruitment and preparation of those who will lead education toward and into the third millenium.

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ABOUT UCEA

The University Council for Educational Administration (UCEA) is a nonprofit corporation whose members are major universities in the United States and Canada. Thirty school districts are affiliated with UCEA.

History

In 1954, members of the Cooperative Program in Educational Administration (Middle Atlantic Region) proposed an organization which would be devoted to improving the professional preparation of educational administrators. To help establish such an organization, a central office with part-time staff was established on the campus of Columbia University, financed by a grant from the W. K. Kellogg Foundation to Teachers College of Columbia.

Between 1956 and 1959, with the help of the staff at the Teachers College office, UCEA's constitution and by-laws were formulated, the organization's purposes were defined, and additional financial support was obtained in the form of a five-year grant from the Kellogg Foundation. The UCEA central office was moved to its present location on the campus of The Ohio State University in 1959 and a small, full-time staff was hired.

Since its inception, the Council has worked to improve the professional preparation of administrative personnel in both continuing education and pre-service programs. UCEA has been a major contributor to:

1. Broadening the content of preparation programs for educational administrators.
2. Extending use of more effective methods of inquiry in educational administration.
3. Shifting educational administration from an anecdotal orientation to a more scientific one, leading to generalizations about organization and leadership.
4. Developing new instructional materials for administrator programs.
5. Fostering exchanges in research and in program development between professors and administrative leaders in the U.S. and their counterparts in other countries.
6. Continuing efforts toward standards of excellence in research and in preparation programs for administrative personnel in educational administration.

More recently, the Council also has focused considerable attention on strengthening relationships between institutions that prepare administrators for service and the school districts and other agencies in which administrators serve. The major means to accomplish this has been the UCEA University and School District Partnership described later in this document.

UCEA GOALS AND ACTIVITIES

UCEA engages in a variety of activities and produces a number of publications and instructional materials. All these activities and products proceed from a basic set of goals sufficiently stable to give the organization identity, yet flexible enough to respond to changing conditions in educational administration.

Goals

Briefly stated, UCEA goals are:

- To advance understanding in all areas relating to educational administration and to enhance the research capability of participating institutions.

- To develop better methods of instruction, new materials, and other approaches to help bring about more effective pre-service and staff development programs for all professionals in educational administration.
- To create more effective pathways and networks for exchanging new understandings and better methods among persons working to advance educational administration.

Program Activities

A representative sample of the many types of activities sponsored by UCEA follows:

- Inter-institutional research projects on such subjects as principalship effectiveness, education policy, and managing resources.
- Articulation of new directions for research and training — for example, in formulating research perspectives, in preparing leaders to anticipate the future, and in establishing criteria for administrator certification.
- Development and testing of training programs for administrators that make effective use of resources in other disciplines — for example, strengthening the humanities in administrator preparation programs.
- Professional renewal opportunities for member institutions — for example, seminars and workshops on subjects such as methods of research, preparing leaders for the future, and coping with the challenges of urban education.
- Involvement of graduate students from member institutions in professional seminars, institutes, and conferences and in research and development projects.
- Creation of new organizations — the UCEA University and School District Partnership and the Inter-American Society for Educational Administration.

Publications

- **Educational Administration Quarterly** (established in 1965), a journal containing conceptual and theoretical articles, research analyses, and reviews of books in educational administration.
- **Educational Administration Abstracts** (established in 1966), a journal produced through the cooperative efforts of UCEA institutions containing brief summaries of articles from approximately 140 professional journals.
- **Journal of Educational Equity and Leadership** (first published in 1980), a periodical devoted to consideration of equity-related educational needs of Hispanics, Blacks, American Indians, Asian-Americans, women, and other groups.
- **UCEA REVIEW**, an in-house periodical that provides up-to-date information on UCEA activities and news from member universities and Partnership school districts.

In addition, UCEA regularly aids in the production and distribution of a wide range of books, monographs, special reports, and other media.

Instructional Materials

UCEA is especially concerned with the need to develop instructional materials that will improve administrator preparation programs. A number of games and simulations have been developed for this purpose, including the "Monroe City" urban simulation, developed and demonstrated in various parts of the U.S. and Canada by more than 180 professors from 40 universities. The most recent UCEA training tool is the Adams Simulation, which contains five simulations of administrative positions in a suburban school district.



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